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EXAMINER	
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ART UNIT	PAPER NUMBER
2161	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/759,804	CHAUDHURI ET AL.	
	Examiner	Art Unit	
	Marc R Filipczyk	2161	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 June 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-48* is/are pending in the application.

4a) Of the above claim(s) *11-34 and 37-41* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,35 and 36* is/are rejected.

7)☒ Claim(s) *1-6,35 and 36* is/are objected to.

8)☒ Claim(s) *42-48* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 January 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6/30/04*.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *3/24/05* .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This Action is responsive to Applicant's amendment and RCE submitted on June 30, 2004 wherein claims 1-10 and 35-36 remain pending, claims 11-34 and 37-41 have been cancelled previously, and new claims 42-48 are added. Hence, claims 1-10, 35-36 and 42-48 are pending.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 30, 2004 has been entered.

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I. Claims 1-10, 35 and 36 are drawn to estimating results by collecting workload information from a database, classified in class 707, subclass 3.

   II. Claims 42-48 are drawn to selecting a value among a set of values for query, classified in class 707, subclass 4.

2. Inventions I and II are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable.

In the instant case invention I (collecting workload) has separate utility such as collecting data in engineering applications. Invention II (selecting a set of values for query) has separate utility such as estimating data for querying systems.

3. Because these inventions are distinct and search Groups I and II are not required to be simultaneous, restriction for examination purposes as indicated is proper.

4. Examiner has conducted a telephone interview with John Campa on March 24, 2005 wherein the Applicants elected Group I, claims 1-10, 35 and 36 with traverse.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Objections

Claims 1-6, 35 and 36 are objected to because of the following informalities: Regarding claims 1 and 35, Examiner suggests replacing "A method" with "A computer implemented method" to clarify that the method is used by a computer.

Claims 2-6 and 36 depend from claims 1 and 35 respectively, and therefore contain the same informalities and are objected to on the same merits.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-10, 35 and 36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 1, 7, 10 and 35, the terms "relative frequency" along with "tuple" and "workload" are indefinite. How is the content of "tuples" and "workload" acquired and how they interact with one another is not definite and inconsistent. It is not clear how "relative frequency" is generated. Second, the terms "given tuple" and "other given tuple" are indefinite. It is not clear what the other tuple is.

Regarding claims 2-6, 8, 9 and 36 depend from claims 1, 7 and 35 respectively, and therefore contain the deficiencies of those claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 6, 7 and 9 are rejected under 35 U.S.C. 102(e) as best as the Examiner is able to ascertain as being anticipated by Osborn et al (U.S. Patent No 6,026,391).

Regarding claims 1, 2, 6, 7 and 9, Osborn discloses a method and medium for estimating result of a current database query, comprising: (title)

collecting workload information related to queries that have been executed on a database (col. 6, line 44-50);

(Note: results of past queries are obtained from a database after execution of the database)

tracing query patterns in the workload information to compare the usage of tuples in the database during execution of the queries (col. 6, lines 23-26);

determining sample weights based on tuple usage for each tuple (col. 6, lines 26-30);

performing a weighted sampling of the database based upon the sample weights (col. 7, lines 17-22); and

(Note: workload includes tuple usage)

executing the database query on the weighted sample to estimate result of the current database query (col. 7, lines 17-22).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3, 4 and 36 are rejected under 35 U.S.C. 103(a) as best as the Examiner is able to ascertain as being unpatentable over Osborn et al (U.S. Patent No 6,026,391) in view of Acharya et al (U.S. Patent No. 6,519,604).

Regarding claims 3 and 36, Osborn discloses all of the subject matter as discussed above with respect to claims 1 and 2 including sampling but does not expressly teach computing aggregates. However, Acharya discloses an approximating querying method for databases with multiple grouping attributes (see title, Acharya) and teaches calculating aggregates (fig. 6, Acharya) for each sampled tuple (*Grouping Columns*). Hence, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to calculate aggregates in Osborn system as done in Acharya method by expanding upon Osborn's potential execution plan that is based on workload storage of characteristics for the respective tables, clusters and indexes to be used (col. 6, lines 27-29, Osborn) to further calculate and keep track of all the aggregates (attributes and characteristics) of the desired tuples (records). One of ordinary skill in the art would have been motivated to compute an aggregate over values in each sampled tuple to more precisely process sampled queries and minimize the execution and increase efficiency of the performed search.

Regarding claim 4, Osborn/Acharya teach multiplying each value by the inverse of the probability with which corresponding tuples were sampled (col. 12, lines 13-23, Acharya).

Claims 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Osborn et al (U.S. Patent No 6,026,391) in view of Lohman et al (U.S. Patent No. 6,356,889).

Regarding claim 5 and 8, Osborn discloses all of the subject matter as discussed above with respect to claims 1 and 7 including calculating weights (fig. 4, item 84, Osborn) but does not expressly teach weights are a function of the frequency of access of tuple. However, Lohman discloses a method for determining optimal database materialization using a query optimizer (see title, Lohman) and teaches weights are the number of queries in the workload that access the tuple (col. 6, lines 45-65, Lohman). Hence, it would have been obvious to a person of ordinary skill in the art to use weights as a function of queries in the workload that access the tuple as done by Lohman in Osborn system by storing the workload tuple information for every query and keeping track how frequently the tuples are accessed in main memory (fig. 1B, block 8, Osborn). One of ordinary skill in the art would have been motivated to track the frequency of sampled tuple to optimize the execution and efficiency of the performed search.

Claims 10 and 35 are rejected under 35 U.S.C. 103(a) as best as the Examiner is able to ascertain as being unpatentable over Osborn et al (U.S. Patent No 6,026,391).

Regarding claim 10, Osborn discloses a system for estimating a result of a database query, the system comprising: (title)

a module collecting workload information related to the database (fig. 2, 46);

a module tracing query patterns in the workload (fig. 2, 42) to identify the usage of tuples in the database during execution of the queries (fig. 2);

a module determining sample weights based on tuple usage (fig. 2, 46);

a module performing a weighted sampling of the database based upon the sample weights (fig. 2, 46); and

a module executing the current database query on the weighted sample to estimate the result of the current database query (fig. 2, 46).

The two modules listed above perform the tasks of the 4 modules claimed. However, although the modules are implemented differently it is the user's choice to derive a functional implementation that processes and returns the same results. Hence, it would have been obvious to a person of ordinary skill in the art at the time the invention was made having Osborn's two modules to modify them so that they could be implemented with two additional modules, where all four modules would perform the tasks of the two original modules. One would have been motivated to use additional modules to perform the same function to divide the work among different applications, to gain processing speed.

Regarding claim 35, Osborn discloses a method and medium for estimating a result of a current database query, the method comprising: (title)

collecting workload information related to queries that have been executed on the database (col. 6, line 44-50);

(Note: results of past queries are obtained from a database after execution of the database)

tracing query patterns in the workload information to identify the usage of tuples in the database during execution of the queries (col. 6, lines 23-26);

determining sample weights based on tuple usage for each tuple (col. 6, lines 26-30);

performing a weighted sampling of the database based upon the sample weights (col. 7, lines 17-22); and

(Note: workload includes tuple usage)

executing the current database query on the weighted sample to estimate the result of the current database query (col. 7, lines 17-22).

Osborn does not expressly teach generating an outlier index. However, it is common to the ordinary skill in the art of computational statistics to derive and manipulate data "outside the box". Having all the workload information, one of ordinary skill in the art would have been motivated to generate and account for outlier indexes in order to obtain accurate results based on the entire data.

Response to Arguments

Applicant's arguments filed on June 30, 2004 have been fully considered but they are not persuasive. The arguments and responses are listed below.

Applicant argues on pages 10-12 in the 6/30/04 response that the amended claims are now patentable over the previous rejection and that the prior art does not disclose a relative frequency as claimed by the Applicants.

In response to Applicant's argument, Examiner disagrees. The argued feature in the independent claims of a relative frequency is not clear and is not given much patentable weight. Instead the feature is rejected under 35 U.S.C. 112, second paragraph. Thus, the arguments based on that feature are void. However, as a result of an interview of 3/24/05, the Applicants have explained the claimed invention and the Examiner looks forward to the future amendment.

With respect to all the pending claims 1-10, 35 and 36, Examiner respectfully traverses Applicant's assertion based on the discussion cited above, as such, Examiner maintains the same rejections.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following patents demonstrate the state of art with respect to estimating a result of a database query based on the amount of times prior queries were used.

U.S. Patent No. 5,504,887 of Malhotra et al.

U.S. Patent No. 6,029,163 of Ziauddin

U.S. Patent No. 6,321,218 of Guay et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marc R Filipczyk whose telephone number is (571) 272-4019. The examiner can normally be reached on Mon-Fri, 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Safet Metjahic can be reached on (571) 272-4023. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MF
March 25, 2005

FRANTZ COBY
PRIMARY EXAMINER